

REMARKS

Claims 28, 29 and 64 are all the claims pending in the application.

Claims 28, 29, and 64 are rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains to make and/or use the invention. Claims 28 and 64 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hopwood (US 4,915,464) in view of Minami (US 5,372,900). Claim 29 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Molteni et al. (US 5,473,447) in view of Moss et al. (US 5,016,953).

Applicants submit that the 35 U.S.C. § 112, first paragraph, rejection is overcome by the present Amendment. Independent claims 28 and 29 are amended herein in a manner described in the specification at pages 56-59. One exemplary method is disclosed at page 56, line 5 - page 57, line 3. A second exemplary method is disclosed at page 57, line 4 - page 58, line 2. A third exemplary method is disclosed at page 58, lines 3-28. Thus, Applicants submit that the claims contain subject matter, which is described in the specification in such a way as to enable one skilled in the art to make and/or use the invention. Therefore, the

Prior Art Rejection of Claim 28:

With respect to claim 28, Applicants submit that the applied references do not teach or suggest the feature of claim 28, as proposed to be amended, of replacing the first reflection type relief hologram with a second reflection type relief hologram and striking reconstructing illumination light of the given wavelength on the second reflection type relief hologram through the photosensitive material, so that second interference fringes produced by interference of light diffracted from the second reflection type relief hologram and the incident light are recorded in

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the photosensitive material. Hopwood discloses at col. 10, lines 8-35, for example, how to prepare a holographic optical element. According to the reference, after each exposure of the holographic optical element, the master hologram is moved a distance equal to twice the width of the notional strip until the whole material has been exposed. See col. 10, lines 32-35. In other words, a single master hologram is used to form the holographic optical element by shifting the master hologram along the holographic optical element until the entire element has been exposed. Thus, Applicants submit that Hopwood fails to teach or suggest replacing the first reflection type relief hologram with a second reflection type relief hologram as claimed in claim 28. Furthermore, Minami fails to make up for this deficiency of Hopwood. Therefore, Applicants submit that claim 28 and its dependent claim 64 are allowable over the prior art.

In response to the Examiner's Response to Arguments in the January 17, 2003 Office Action, Applicants submit the following comments. The volume hologram is a hologram in which interference fringes produced by the interference of light are three-dimensionally recorded as fringes having varying refractive indices in a photosensitive material in its thickness direction, whereas the thin hologram is a hologram with interference fringes recorded by forming minute pits and projections on the surface of a hologram-forming layer, which is distinct from the volume hologram.

The Examiner admits that Hopwood fails to explicitly teach that the holograms recorded are volume holograms or that a reflection type master hologram is a relief hologram. Instead, the Examiner asserts that it would have been obvious to one of ordinary skill in the art to have used volume holograms and relief type holograms, because these types of holograms are well known

in the art and because the specification does not indicate the criticality of using these types of holograms.

The Examiner asserts that since both volume holograms and thin holograms are known types of holograms distinguished only by the fringe size compared to the thickness of the recording plate, it would have been an obvious matter of design choice to produce the hologram as a volume hologram. As the Examiner correctly recognizes, there are different classifications for holograms. (However, the holograms are not interchangeable as the Examiner contends, as the holograms are created in fundamentally different ways. In thin holograms, the fringes are formed two-dimensionally as changes of surface irregularity. By contrast, in volume holograms, fringes are recorded three-dimensionally in the hologram. Accordingly, the difference between holograms in Hopwood and that of the present invention is not merely fringe sizes, but a fundamental difference in recording fringes.

Fig. 14(c) of the present application shows an example of interference fringes being recorded as volume interference fringes, wherein high- and low-refractive-index areas occur alternately and spatially, and are arranged at a constant pitch (page 49, lines 17-24). In Fig. 14(c), reference numerals 102₁, 102₂, 102₃ and 102₄ are pixels. The present invention relates to how to fabricate a hologram recorded medium (101 in Fig. 14(b)) such as one having varying diffraction gratings.

In claim 28, a CGH replication method is disclosed as the method of fabricating a hologram-recorded medium, wherein a first CGH is used to produce first interference fringes, which are recorded in the photosensitive material. Then, the first CGH is replaced by a second CGH to produce second interference fringes, which are recorded in the photosensitive material.

As shown in Fig. 14, for example, a plurality of patterns can be recorded, each comprising a group of pixels with the same volume interference fringes 103 recorded therein (page 55, line 15 to page 56, line 13).

For multi-recording, therefore, the hologram used must be a volume hologram; that is, with a relief (thin) hologram it is impossible to obtain a hologram recorded medium comprising such pixel groups as contemplated in the present invention.

Accordingly, the use of volume holograms and relief holograms cannot simply be read into the claim without a suggestion or motivation to do so from the prior art. Moreover, the Examiner has not asserted such a motivation or suggestion. Therefore, claim 28 is believed to be allowable over the prior art for this additional reason.

Prior Art Rejection of Claim 29:

The Molteni et al. and Moss et al. references are applied against claim 29. Applicants submit that neither of these references teach or suggest the feature of amended claim 29 of replacing the first transmission type hologram with a second transmission type hologram and striking reconstructing illumination light of the given wavelength on the second transmission type hologram through the photosensitive material, so that second interference fringes produced by interference of light diffracted from the second transmission type hologram and the incident light are recorded in the photosensitive material. The Examiner refers to FIG. 6 and cols. 13-14 of Molteni et al. as disclosing the hologram stereogram recording method of the reference. However, nothing in this portion of the reference, or the remainder of the reference, teaches or suggests the above-noted feature of claim 29. Instead, Molteni et al. disclose a single hologram H_1 used to produce the hologram H_2 . See col. 13, line 61 - col. 14, line 25. Also, Moss et al. fail

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to make up for this deficiency of Molteni et al. Hence, Applicants submit that claim 29 is allowable over the prior art.

Also, Applicants submit that claim 29 is allowable over the prior for the additional reason that there is no motivation or suggestion to modify Molteni et al. to include a volume hologram. The argument described above in relation to claim 28 regarding the differences between volume and thin holograms applies to claim 29 as well. Therefore, Applicants submit that claim 29 is allowable over the prior art for this reason as well.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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